

REMARKS

Claims 1-3 and 28-32 were pending prior to this Response. By the present communication, claims 1 and 29 have been amended to define Applicants' invention with greater particularity; claims 33-38 have been added; and no claims have been canceled. The amendments and new claims do not add any new matter, being fully supported by the specification. Support for the amendments to claims 1 and 29 are may be found, for example, in the specification as published (U.S. Patent Application Publication 2001/0055814) at paragraph [0029] and in Figure 4. Accordingly, upon entry of the present amendment, claims 1-3 and 28-38 will be pending in this application.

Rejections under 35 U.S.C. §102

Claims 2, 29, and 31 stand rejected under 35 U.S.C. §102(b) as allegedly being anticipated by Majewski. Applicant respectfully traverses the rejection as it applies to the pending claims.

To anticipate, a single reference must inherently or expressly teach each and every element of claimed invention. *In re Spada*, 15 USPQ2d 1655 (Fed Cir. 1990); and *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). MPEP § 2131. Further, the claimed invention must be distinct from what is apparently inherent in the reference, and the reference must be enabling to place the allegedly disclosed matter in the possession of the public. *In re Fitzgerald et al.*, 619 F.2d 67, 205 USPQ 594 (CCPA 1980); and *Akzo N.V. v. U.S. Int'l Trade Comm'n*, 1 USPQ2d 1241, 1245 (Fed. Cir. 1986).

Specifically, the Office alleges Majewski teaches two spaced piezoelectric actuators 20a and 20b surrounding an unrestricted tube 14 and coupled to a driver for sequential actuation (Figure 2). The action further alleges that Figure 5 shows that actuation of the actuators distal from the orifice can be performed first, that the capillary may allegedly be made of quartz (column 6, line 50), and that a taper is allegedly shown in Figure 3.

Applicant respectfully submits that Majewski does not anticipate Applicants' invention because Majewski fails to teach each and every element of the claims as amended. Without

acquiescing to the rationale of the Office and to expedite prosecution of the instant application, Applicant has amended claims 1 and 29. The claims as amended recite the limitation “wherein the driver is configured to produce a square voltage waveform that is slowly ramped downward from the peak voltage value to actuate the first and second actuators”. Applicant asserts that Majewski fails to disclose such a limitation.

Furthermore, Applicant respectfully submits that Majewski fails to teach 2 piezoelectric actuators mechanically coupled to a fluid chamber. The Office alleges Majewski teaches a tubular member characterized by substantial elasticity (column 4, lines 56-57) that allegedly includes, two spaced piezoelectric actuators 20a and 20b surrounding an unrestricted tube 14. Applicant respectfully directs the Examiner to column 5, lines 21-26 of Majewski disclosing that items 20a and 20b are “a pair of axially displaced ring like coatings” (column 5, lines 21-26). The coating is simply a conductive coating disposed on the surface of the tube member which is composed of piezoelectric crystals (such as lead oxide titanium oxide, zirconium oxide, lentharium oxide) mixed with quartz and an elastic binder. Unlike the present invention, the tube disclosed in Majewski is not separate and distinct from the capillary as encompassed by the present invention in which the piezoelectric actuators are “mechanically coupled” to the surface of the separate and distinct capillary. See, for example, paragraph [0025] of the specification as published, Figure 2, and Figure 3 showing that the actuators may be mounted on the surface of the capillary, for example, with “a small amount of epoxy or other suitable adhesive.”

For the reasons discussed above, Applicant respectfully asserts that the Majewski fails to teach each and every limitation of the claims as amended. As such the reference fails to anticipate Applicant’s invention. Accordingly, Applicant respectfully requests that the rejection of claims 2, 29 and 31 under 35 U.S.C. §102 be withdrawn.

Rejections under 35 U.S.C. §103

Claims 30 and 32 are rejected under 35 U.S.C. §103(a) as allegedly being obvious over Majewski as applied to claims 2, 29 and 31. Applicant respectfully traverses the rejection as it applies to the pending claims.

The recent U.S. Supreme Court decision in *KSR International v. Teleflex Inc.* (82 USPQ 2d 1385), modified the standard for establishing a *prima facie* case of obviousness. Under the KSR rule, three basic criteria are considered. First, some suggestion or motivation to modify a reference or to combine the teachings of multiple references still has to be shown. Second, the combination has to suggest a reasonable expectation of success. Third, the prior art reference or combination has to teach or suggest all of the recited claim limitations. Factors such as the general state of the art and common sense may be considered when determining the feasibility of modifying and/or combining references.

The Office alleges that it would have been obvious to size the device of Majewski et al. in order to dispense desired volumes and to provide actuators distal from the orifice as shown in Figure 6, resulting in a spacing of 10 mm or more from the orifice of a large scale dispenser. Applicant respectfully submits that such allegation is moot in light of the amended claims. Claim 29, as amended, is directed to an apparatus for dispensing droplets of fluid including the limitation “wherein the driver is configured to produce a square voltage waveform that is slowly ramped downward from the peak voltage value to actuate the first and second actuators”.

Applicant respectfully submits that Majewski fails to disclose this claim limitation. Additionally, Applicant respectfully submits that the waveform of the presently amended claims could not be used in the device disclosed in Majewski to produce the desired deflection of the flexible tubular member as depicted in Figure 5 of Majewski. Figure 5 shows the theoretical preferred waveform of the flexible tubular member produced by actuation of the “ring like coatings”. Such a waveform of the flexible tubular member would not be produced by activation of the ring like coatings with the voltage waveform as recited in the presently amended claims. Activation of the “ring like members” using a voltage waveform of the present invention would produce deflections in the flexible tubular member that are irregular and not in a sinusoidal

peristaltic fashion as disclosed in Figure 5. As such, the invention encompassed by the presently amended claims is not rendered obvious by Majewski because it fails to teach or suggest all of the recited claim limitations and the device disclosed by Majewski could not have employed the presently claimed waveform.

Accordingly, Applicant respectfully requests withdrawal of the rejection of dependent claims 30 and 32 under 35 U.S.C. §103(a).

Claims 1-3 and 28-32 are rejected under 35 U.S.C. §103(a) as allegedly obvious over Majewski as applied to the claims above, and further in view of WO 97/48557 (WO) and/or Iwasaki. Applicant respectfully traverses the rejection as it applies to the pending claims.

Specifically, the Office alleges that it would have been obvious to provide substantially simultaneous firing in the device of Majewski in order to provide a simultaneous wave as an alternative to a sequential wave as taught by WO. Applicant respectfully submits that such allegation is moot in light of the amended claims.

As discussed above, the claims as amended are directed to an apparatus for dispensing droplets of fluid including the limitation “wherein the driver is configured to produce a square voltage waveform that is slowly ramped downward from the peak voltage value to actuate the first and second actuators”. Applicant respectfully submits that the amendments to the claims renders the rejection moot because the cited references fail to disclose the new claim limitation. As such, the invention encompassed by the claims as amended is not rendered obvious by the cited combination because the combination fails to teach or suggest all of the recited claim limitations. As previously discussed, the device disclosed by Majewski could not use the presently claimed voltage waveform because the presently claimed waveform could not produce the peristaltic deflection of the flexible tubular member as disclosed in Majewski (see Figure 5). The same is also true for the inventions disclosed in both WO and Iwasaki. The waveforms contemplated for use with the device disclosed in Iwasaki are shown in Figure 8 of Iwasaki and are all different than that recited in the presently amended claims. Preferable waveforms used by Iwasaki are represented in output D (rectangular waveform) and E (sinusoidal waveform) of

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Figure 8 (presented on Sheet 3 and described in column 4 from line 59, to column 6, line 2). Similarly, the waveforms contemplated for use in the device disclosed in WO are those forms that produce a pressure pulse characterized by creation of constructive interference of the wave patterns generated by the pulse to effectuate droplet ejection (see page 13, lines 17-26). Such an effect could only be produced by a symmetrical voltage waveform, such as a symmetrical square or sinusoidal voltage waveform, not the asymmetrical waveform recited in the currently amended claims. As such, the invention encompassed by the presently amended claims is not rendered obvious by the cited combination because the combination fails to teach or suggest all of the recited claim limitations and the devices disclosed by the combination could not have employed the presently claimed waveform.

Accordingly, Applicant respectfully requests withdrawal of claims 1-3 and 28-32 under 35 U.S.C. §103(a).

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Conclusion

In view of the amendments and above remarks, it is submitted that the claims are in condition for allowance, and a notice to that effect is respectfully requested. The Examiner is invited to contact Applicant's undersigned representative if there are any questions relating to this application.

The Commissioner is hereby authorized to charge \$120.00 as payment for the one-month Extension of Time fee, large entity, to Deposit Account No. 07-1896. No other fee is deemed necessary with the filing of this paper. However, if additional fees are due, the Commissioner is further authorized to charge any fees, or make any credits, to Deposit Account No. 07-1896 referencing the above-identified attorney docket number.

Respectfully submitted,



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